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Does dry weather limit tillage options?

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Although most of Iowa's topsoils are dry, most subsoil moisture levels are near normal. The dry, warmer than normal winter of 2001-2002 allowed the precipitation that was received to infiltrate unfrozen soils. Weather patterns indicate a dry spring through April and early May, similar to that of 1996. Agricultural drought is not expected in more than 5 percent of Iowa counties according to Elwynn Taylor, Iowa State University Extension Climatologist. However, any prediction of dry weather raises concerns, so producers are looking for ways to preserve soil moisture.

A dry spring means that conditions are right for moisture loss from normal spring tillage operations. Without sufficient topsoil moisture, seed germination could be impaired, resulting in poor crop development and low yield. Other drought-related risks include increased insect infestation, low resistance to plant disease, and the possibility of wind erosion on highly erodible soils where crop residue is minimal. The good news is that soil moisture can be partially managed with tillage, even in a dry year. If you've experienced low levels of precipitation since harvest, or if your area is in that 5 percent that may experience drought, you should consider modifying your spring tillage management plans. You could limit your crop's susceptibility to drought (from emergence to maturity) by minimizing the number of tillage or cultivation passes. Growers also may remove or control weeds to save moisture for the crop and reduce weed competition for moisture.

Conservation practices can play a major role in managing soil moisture conditions. The absence or reduction of soil disturbance in no-till both minimizes soil moisture loss from the soil's surface and maximizes soil moisture storage. They also enhance beneficial soil physical properties such as increased infiltration rate, maintenance of soil macropores, and reduction of surface runoff during rainfall, thus increasing soil moisture storage.

Generally, every soil disturbance of a tillage pass can cause the loss of 1/4 inch of soil moisture. However, this number varies based on soil texture, percentage of soil organic matter, and the amount of residue on the soil surface. Getting the crop off to a good start this year may be critical, especially if subsoil moisture is adequate.

Choosing appropriate spring-tillage operations in a potentially dry year depends on the type of tillage you performed last fall. If the soil and crop residue have been undisturbed since harvest, the soil may have retained some

moisture in the top few inches due to the barrier effect of crop residue against moisture loss. If tillage also is used for herbicide incorporation, check the label requirements and tillage timing accordingly. Do not till deeper than needed for incorporation. If your soil is very dry, consider postemergence weed management that limits or avoids incorporating herbicide.

Soils that received primary tillage last fall may need to be leveled with a secondary tillage operation before planting. Two strategies can be used to conserve soil moisture: early spring or just before planting. With an early spring strategy, the soil is opened up for some drying, but any spring rain that does occur can cause soil erosion. With a late spring strategy, the tillage and leveling operation is delayed until as close to planting time as possible. Using tillage just before planting preserves soil moisture present in the tilled depth and reduces soil moisture before planting.

It also helps to know your soil. If you have soils with poor internal drainage, consider light tillage passes with a field cultivator or disk just before planting. This strategy dries the surface enough to plant without causing undue moisture loss. For soils with adequate internal drainage, no-till may offer the best management choice.

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